

30 October 2003

To: Paul Philp
DOE Project Manager, Run IIb CDF Detector Project

From: Pat Lukens
Project Manager for the Run IIb CDF Detector Project

Subject: Run IIb CDF Detector Project September 2003 Report

Attached is the monthly report summarizing the September 2003 activities and progress for the Fermilab RunIIb CDF Detector Project. This report is available electronically at:

<http://www-cdf.fnal.gov/run2b.html>

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RunIIb CDF Detector Project
Progress Report No. 10
1 - 30 September 2003

I. PROJECT DESCRIPTION

The primary goal of the CDF Run IIb Detector Project is to enable the detector to exploit the physics opportunities available during Tevatron operation through 2008. The data from Run II will represent a set of detailed measurements that can be compared with the predictions of the Standard Model at the highest available collision energy. The increased size of the data sample will allow us to study the top quark by measuring the details of its production and decay mechanism. In addition, we plan precision electroweak and QCD measurements, continued searches for a variety of phenomena that are predicted to exist beyond the Standard Model framework, and to explore CP violation in the b quark sector. The detailed physics goals of the upgrade are described in the Technical Design Report (TDR).

The major tasks of this upgrade are:

- Upgrade the calorimeter by replacing the Central Preradiator Chamber with a device with shorter response time to allow operation in a high-luminosity environment, and adding timing information to the electromagnetic calorimeters.
- Upgrade the data acquisition and trigger systems to increase throughput needed for higher luminosity operation and efficiently trigger on the higher multiplicity events of Run IIb.

II. OVERVIEW OF PROJECT STATUS – P. Lukens

This monthly report will contain the report on progress made during the month of September, and financial tables that cover the costs incurred up to the end of the month, as is our custom.

The project status is now undergoing internal review. The main elements of the project that remain after last month's cancellation of the silicon are being reevaluated in the context of operation until 2008 with the current silicon detector. The strategy for the later years of run II without a silicon replacement has not been discussed. We will resolve this in the coming weeks, as well as establishing a "close out" plan for the silicon detector work. A Draft Baseline Change Proposal is expected to be submitted before the end of October 2003.

The remaining scope of the project, in general, has fallen behind the schedules baselined last year. One milestone was missed this month, 1.3.5.2.5, but this was a management decision, and not a failure to achieve some goal. The computers described in this task were judged to be unnecessary at this time. We will want them in the future, but the purchase will be more useful for the experiment if it is deferred. Change control will be submitted in November to correct this.

III. PROJECT MILESTONE SUMMARY

CDF Level 2 Schedule Milestones from the Resource Loaded schedules

WBS	Title	Baseline Comp. Date	Forecast/Actual Completion Date	Complete
1.2.1.10.1	First phototube order placed	9-May-03	1-Apr-03	Yes
1.2.2.2.7.1	Prototype Testing Complete	16-May-03	28-Mar-03	Yes
1.2.2.2.7.4	ASD->TDC Cables ready for installation	16-May-03	26-Aug-03	Yes
1.2.2.2.7.2	CEM Splitters ready for installation	19-May-03	29-Jul-03	Yes
1.2.2.2.7.3	PEM Harnesses ready for installation	2-Sep-03	28-Apr-03	Yes
1.2.2.2.7.5	All cables done and ready to install	2-Sep-03	26-Aug-03	Yes
1.3.5.2.5	Arrival of 0/10 PCs from the vendor	10-Sep-03	10-Sep-03	
1.2.1.10.2	1 st Calorimeter WLS fiber holder finished	7-Oct-03	4-Dec-03	
1.2.2.2.7.8	VME Crate ready for installation	7-Oct-03	30-Apr-03	Yes
1.3.1.6.7	First Prototype TDC available for test	19-Nov-03	19-Nov-03	
1.2.1.10.4	1 st CPR module finished and tested	11-Dec-03	12-Feb-04	
1.2.2.2.7.10	Upstairs components ready to install	7-Jan-04	7-Jan-04	
1.2.2.2.7.11	All EM Timing components ready to install	7-Jan-04	8-Jan-04	
1.2.2.2.7.6	ASD/TB ready for installation	7-Jan-04	8-Jan-04	
1.2.2.2.7.7	Downstairs components ready to install	7-Jan-04	8-Jan-04	
1.2.2.2.7.9	TDC boards ready for installation	7-Jan-04	11-Jun-04	
1.3.3.2.3.4	Begin fabrication of Prototype Finder 1/3 board	8-Jan-04	8-Jan-04	
1.2.1.10.3	First set of Calorimeter phototubes tested	30-Jan-04	20-Oct-03	
1.2.1.10.6	1 st CCR module finished and tested	12-Feb-04	8-Apr-04	
1.3.3.8.1.9	Prototype XFT Linker Module available for testing	26-Mar-04	26-Mar-04	
1.2.1.10.5	2 nd set of Calorimeter phototubes tested	21-May-04	18-Feb-04	
1.3.4.4.1.4	Prototype Event Builder hardware arrives	3-Jun-04	3-Jun-04	
1.2.1.10.7	50% Calorimeter CPR Detectors Tested	4-Jun-04	2-Aug-04	
1.3.4.5.3	Production Readiness Rev - Event Builder	24-Jun-04	24-Jun-04	
1.2.1.10.8	50% Calorimeter CCR Detectors tested	30-Aug-04	26-Oct-04	
1.3.2.6.3	Begin production of Level 2 Pulsar system	17-Sep-04	17-Sep-04	
1.3.3.10.3.3	Preproduction XFT Stereo Assoc Modules	29-Nov-04	29-Nov-04	
1.3.6.5	SVT ready for installation	13-Dec-04	13-Dec-04	
1.3.1.12	Beginning of TDC Production	10-Jan-05	10-Jan-05	
1.3.4.5.4.4	Arrival of Event Builder hardware	3-Feb-05	3-Feb-05	
1.2.1.10.10	Final Calorimeter CCR Detector Tested	24-Mar-05	19-May05	
1.2.1.10.9	Final Calorimeter CPR Detector Tested	24-Mar-05	19-May05	
1.3.5.5.5	Arrival of 70 L3 & 15 DAQ PCs from the vendor	24-Mar-05	24-Mar-05	
1.3.5.6.5	Arrival of 140/20 PCs from the vendor	24-Mar-05	24-Mar-05	
1.3.3.8.3.3	Begin Production of XFT Linker Modules	24-Mar-05	24-Mar-05	
1.3.3.2.6.9	Begin Production Finder SL7 boards	28-Mar-05	28-Mar-05	
1.3.5.8	Finish Purchase of Computers for L3/DAQ	14-Apr-05	14-Apr-05	
1.3.4.8	Finish Event-Builder Upgrade	5-May-05	5-May-05	
1.2.1.10.11	Final set of Calorimeter phototubes tested	6-May-05	29-Apr-05	
1.2.1.10.12	End of Central Preshower Project	6-May-05	19-May05	
1.2.3.5	End of Calorimetry Project: Level 2	6-May-05	19-May05	
1.3.2.9	Pulsar Level 2 subproject ready for installation	9-Jun-05	9-Jun-05	
1.3.1.14.16	Data Concentrator Production Completed	29-Jul-05	29-Jul-05	
1.3.3.10.4.6	XFT Production Stereo Modules complete	18-Aug-05	18-Aug-05	
1.3.3.23	XFT Ready for Installation at CDF	29-Sep-05	29-Sep-05	
1.3.1.13.10	TDC Production Board testing complete	30-Sep-05	23-Sep-05	
1.3.1.16	Run 2b TDC Ready for Installation	30-Sep-05	23-Sep-05	
1.3.8	Finish Run 2b Trigger DAQ project	30-Sep-05	30-Sep-05	

CDF RunIIb Calorimeter Schedule Level 2 Milestones

WBS	Name	2003				2004				2005				2006	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.2.2.2.7.1	EMTiming Prototype Testing Complete			3/28	◆	100%									
1.2.1.10.1	1st Calorimeter phototube order placed			4/1	◆	100%									
1.2.2.2.7.3	EMTiming PEM Harnesses ready to install			4/28	◆	100%									
1.2.2.2.7.8	EMTiming VME Crate ready to install			4/30	◆	100%									
1.2.2.2.7.2	EMTiming CEM Splitters ready to install			7/28	◆	100%									
1.2.2.2.7.4	EMTiming ASD->TDC Cables ready to install			8/26	◆	100%									
1.2.2.2.7.5	All EMTiming cables done and ready to install			8/26	◇	100%									
1.2.2.2.7.9	EMTiming TDC boards ready to install			9/30	◆	100%									
1.2.2.2.7.10	EMTiming Upstairs components ready to install			9/30	◆	100%									
1.2.1.10.2	1st Calorimeter WLS fiber holder finished			10/7	◇	0%									
1.2.1.10.3	1st set of Calorimeter phototubes tested			10/20	◆	0%									
1.2.1.10.4	1st Calorimeter CPR module finished and tested			12/11	◇	0%									
1.2.2.2.7.6	EMTiming ASD/TB ready to install			1/8	◇	0%									
1.2.2.2.7.7	Downstairs EMTiming components ready to install			1/8	◇	0%									
1.2.2.2.7.11	All EMTiming components ready to install			1/8	◇	0%									
1.2.1.10.6	1st Calorimeter CCR module finished and tested			2/12	◇	0%									
1.2.1.10.5	2nd set of Calorimeter phototubes tested			2/18	◆	0%									
1.2.1.10.7	50% Calorimeter CPR Detectors Tested			6/4	◇	0%									
1.2.1.10.8	50% Calorimeter CCR Detectors Tested			8/30	◇	0%									
1.2.1.10.9	Final Calorimeter CPR Detector Tested			3/24	◇	0%									
1.2.1.10.10	Final Calorimeter CCR Detector Tested			3/24	◇	0%									
1.2.1.10.11	Final set of Calorimeter phototubes tested			4/29	◇	0%									
1.2.1.10.12	End of Central Preshower Project			4/29	◇	0%									
1.2.3.5	End of Calorimetry Project: Level 2			4/29	◇	0%									

Project: CDF RunIIb Calorim
Date: Oct 24 '03

Task



Progress



Baseline



Milestone



Baseline Milestone



Summary



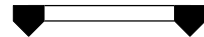
Rolled Up Task



Rolled Up Milestone



Baseline Summary



Rolled Up Baseline



Rolled Up Baseline Milestone



Rolled Up Progress



Split



External Tasks



Project Summary



CDF Run2b Trigger/DAQ Schedule Level 2 Milestones

ID	WBS	Name	2002				2003				2004				2005				2006		
			Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
19	1.3.5.2.5	Arrival of 0/10 PCs from the vendor								9/10	◆			0%							
390	1.3.1.6.6	First Prototype TDC available for testing								12/15	◆			0%							
280	1.3.3.2.3.4	Fabrication of Prototype XFT Finder 1/3 board								1/8	◆			0%							
245	1.3.3.8.1.9	Prototype XFT Linker Module available for testing								3/26	◆			0%							
61	1.3.4.4.1.4	Arrival of the prototype Event Builder hardware								6/3	◆			0%							
72	1.3.4.5.3	Event Builder Production Readiness Review								6/24	◆			0%							
105	1.3.2.6.3	Begin production of Level2 Pulsar system								9/17	◆			0%							
219	1.3.3.10.3.3	Begin Preproduction XFT Stereo Association Modules								11/29	◆			0%							
11	1.3.6.5	SVT ready for installation								12/13	◆			0%							
426	1.3.1.1.12	Beginning of TDC Production								2/2	◆			0%							
78	1.3.4.5.4.4	Arrival of the Event Builder hardware								2/3	◆			0%							
255	1.3.3.8.3.3	Begin Production XFT Linker Modules								3/24	◆			0%							
36	1.3.5.5.5	Arrival of 70 Level3 and 15 DAQ PCs from the vendor								3/24	◆			0%							
49	1.3.5.6.5	Arrival of 140/20 PCs from the vendor								3/24	◆			0%							
319	1.3.3.2.6.9	Begin Production XFT Finder SL7 boards								3/28	◆			0%							
52	1.3.5.8	Finish Purchase of Computers for Level3/DAQ system								4/14	◆			0%							
83	1.3.4.8	Finish Event-Builder Upgrade								5/5	◆			0%							
115	1.3.2.9	Pulsar Level 2 subproject ready for installation								6/9	◆			0%							
445	1.3.1.14.16	TDC Data Concentrator Production complete								7/29	◆			0%							
230	1.3.3.10.4.6	XFT Production Stereo Association Modules complete								8/18	◆			0%							
326	1.3.3.2.3	XFT Ready for Installation at CDF								9/29	◆			0%							
467	1.3.1.13.10	TDC Production Board testing complete								10/17	◆			0%							
468	1.3.1.1.16	Run 2b TDC Ready for Installation								10/17	◆			0%							
469	1.3.8	Finish Run 2b Trigger DAQ project								10/17	◆			0%							

Project: CDF Run 2B Data A
Date: Oct 24 '03

Task



Rolled Up Baseline



Progress



Rolled Up Baseline Milestone



Baseline



Rolled Up Progress



Milestone



Split



Baseline Milestone



Baseline Split



Summary



External Tasks



Rolled Up Task



Project Summary



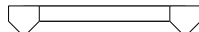
Rolled Up Milestone



Group By Summary



Baseline Summary



IV. PROCUREMENT – P. Lukens

A requisition for Preshower work at Argonne went through this month. Also, small quantity parts were ordered for the development of the new event builder.

V. PROJECT HIGHLIGHTS

1.1 – Silicon Detector

A “close out” plan for the silicon project is currently being developed. The current scope of the close out includes construction of 15 staves and a small number of Layer 0 modules. These units will be mounted onto a prototype barrel structure, and a full system readout test will be performed. Results of this will be published, and the work done to develop the run IIb silicon detector will then be available to future detector developers.

1.2 – Calorimeter

1.2.1 Central Preshower and Crack Detector – Steve Kuhlmann

The Central Preshower/Crack Upgrade continued to make progress in September. The main focus, at this time, has shifted to the fibers needed for the 2nd full-scale Preshower prototype, and the fibers for the 1st full-scale Crack prototype. In addition to this, tiles for the first Crack prototype were delivered from Fermilab’s Village Lab 8. Optimization tests continue at INFN, Rockefeller, and Argonne. One example of these tests is the comparison between a Tyvek tile wrap and a wrap using a relatively new 3M product called Radiant Mirror. The new wrap gave 43% more light output than Tyvek, hence we will use this for production modules.

1.2.2 Electromagnetic Timing – Dave Toback

September 2003 saw the continued success of the EM Timing project with more Level 2 milestones met. The production quality prototypes are installed on the detector and are still functioning better than expected. The rest of the components are in production, on or well ahead of schedule, or are already completed. The PEM harnesses are complete, tested and ready to be installed. The CEM splitter harnesses are complete, tested and ready to be installed. The long cables from ASD->TDC cables are complete, tested and ready to be installed. The TDC crate is fully functional and running. We now have 60% of the TDC's in hand and it is expected the others will be available before the scheduled arrival date. The ASD's and TB printed circuit boards (PCBs) have arrived in Italy and are being stuffed. Their expected arrival date at Fermilab is well ahead of schedule. Our test stand room is fully functional with production quality components for final testing when the boards arrive. It is believed that all components are on schedule to be ready by the end of the summer.

1.3 –Data Acquisition and Trigger

1.3.1 TDC (Time to Digital Converter) – Henry Frisch, Ting Miao

We are continuing on the board schematic for the TDC. At the same time, we are working on fixing some minor problems that still exist in the FPGA. The crucial problem is that we are failing in the transfer of the Level 2 small buffers to the one large memory that communicates with the VME bus. We suspect that the settling time is insufficient in the current design and we are currently engaged in trying to prove that this is the problem.

Discussions have begun with the Particle Physics Division Electrical Engineering group to add engineering support to this project in order to speed up the development and eventual testing of the prototypes.

1.3.2 Level 2 – Ted Liu, Peter Wittich

The CDF Level 2 Trigger system continues to make progress on the following fronts:

- Pulsar hardware, firmware and VME software,
- PCI and CPU performance studies, and
- S-LINK data format definition for all data paths.

All Pulsar prototypes have been fully tested for robustness. No design problems have been identified therefore we are convinced there is no need for any design revisions. This includes the following components:

- Pulsar motherboard,
- Hotlink transmitter and receiver mezzanine cards,
- Taxi transmitter and receiver mezzanine cards, and
- Back of crate transition module.

Both Pulsar firmware and VME software have been greatly improved to allow fully automated testing. With the automated testing procedures and the complete success of all prototypes, we are ready for Pulsar hardware preproduction, roughly six months ahead of schedule. The mezzanine card production has been finished and all testing has been completed. Preproduction of the Back of crate transition modules have begun. One of the prototype Pulsar motherboards together with four Hotlink mezzanine cards have been configured as a Level 2 Muon interface board and has been successfully running in the system and taking beam data for over one week. Total amount of data taken before shutdown was 2.6 inverse picobarns. Off-line analysis shows there was not a single error in processing the muon data through the Pulsar Muon Board. As a result, this board has been officially chosen to become the RunIIa Muon Interface Board and will replace the Michigan Muon Board.

The work on testing the CPU performance on modern CPUs with Linux operating system for the Level 2 trigger decision algorithm latency has been completed. The results indicate that modern CPUs (~2 GHz desktop PCs) with Linux operating systems have much better performance than the old Alpha's (500MHz without operating system) being used in the current Level 2 trigger system. The work on testing the SLINK to PCI card (S32PCI64, designed at CERN for Atlas) performance has been done and it performed as expected. We have measured the timing of this round trip and the performance is well within specifications.

Two new Post-docs from Penn and University of Chicago are now working on two Level 2 data paths using the Pulsar board. More specific details about the project progress can be found at:

http://hep.uchicago.edu/~thliu/projects/Pulsar/L2_upgrade_meeting.html

1.3.3 XFT (eXtremely Fast Tracker) II – Richard Hughes, Brian Winer

The Linker upgrade work at Ohio State University has been focused on implementing the improved tracking linking algorithm in the latest Altera Stratix devices. We have fit the design into the target device (an EP1S25), and we have successfully tested the full design with the simulator. Work continues on the Linker and Finder upgrade modules to determine which devices will actually be used on the board and their specific layout (schematic capture). Recent hiring actions at both OSU and University of Illinois have increased the physicist effort on this project, and will improve progress.

1.3.4 Event Builder – Bruce Knuteson

We have converged on a Cisco Catalyst 6509 gigabit ethernet switch, and on a VMIC 7805 single board computer to read out CDF's VRB crates into the switch. Purchase orders for the Cisco switch and two VMIC 7805 boards have been generated. We considered both fiber and copper links from the VRB crates on the 1st floor of the CDF Assembly Building to the switch on the 3rd floor, and have saved the project roughly \$25,000 by reversing our initial penchant for fiber, going instead with copper. Space has been allocated on the 3rd floor of the Assembly Hall for the prototype system. We will begin to construct the prototype system during the upcoming September shutdown.

1.3.6 SVT (Silicon Vertex Tracker) – Luciano Ristori

No work is scheduled to begin on the Silicon Vertex tracker trackfitter and merger boards until later in calendar year 2004.

VI. FINANCIAL STATUS

The status of the costs and obligations applicable to the Project are currently being re-evaluated and revised. A discussion of the Project financial status will be included in future reports after the new baseline is established.

The Cost Performance Report is included this month and gives a complete earned value calculation of the project down to Level 3 of the Work Breakdown Structure through the end of September. Earned value calculations are shown for this reporting period (columns 2-6) as well as the project to date (columns 7-11). Column 12 contains our current value of BAC, and will only be changed after the formal implementation of the Change Control process.

CDF Project EQU Cost Performance Report at WBS Level 3

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:						Contract Type/No:			Project Name/No: CDF RIIb Master EQU		Report Period: 8/31/2003		
Quantity		Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit	Fee %	Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling	
1		24,987,050		0		0	0	24,987,050	0		0	0	
Funding Type-CA		Current Period					Cumulative to Date					At Completion	
WBS[2]		Budgeted Cost		Actual Cost Work	Variance		Budgeted Cost		Actual Cost Work	Variance			
WBS[3]		Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	
Item		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
EQU Equipment													
1.1 Run 2b Silicon Project													
1.1.1 Administration													
		11,559	11,369	0	-190	11,369	78,853	78,986	0	133	78,986	461,456	
		115,801	0	63,562	-115,801	-63,562	547,143	386,598	335,799	-160,544	50,799	5,114,383	
1.1.2 DAQ													
		12,236	0	21	-12,236	-21	40,040	201,434	56	161,394	201,378	945,613	
1.1.3 Sensors													
		6,018	0	6	-6,018	-6	117,483	15,732	22,753	-101,751	-7,020	486,199	
1.1.4 Cooling and Monitoring													
		89,657	0	-15	-89,657	15	130,872	38,553	113,280	-92,319	-74,727	2,141,524	
1.1.5 Construct Modules, Staves and L0													
		86,371	0	-684	-86,371	684	475,650	337,165	235,357	-138,485	101,808	2,858,484	
1.1.6 Support Mechanics													
WBS[2]Totals:		321,642	11,369	62,889	-310,273	-51,520	1,390,041	1,058,469	707,244	-331,572	351,224	12,007,658	
1.2 Calorimeter Upgrades													
1.2.1 Central Preshower & Crack Detectors													
		47,512	4,961	0	-42,552	4,960	115,729	46,625	3,180	-69,104	43,445	306,093	
1.2.2 Electromagnetic timing													
		0	0	17	0	-17	35,630	35,630	23,403	0	12,227	35,630	
WBS[2]Totals:		47,512	4,961	18	-42,552	4,943	151,360	82,256	26,583	-69,104	55,673	341,723	
1.3 Run 2b DAQ and Trigger Project													
1.3.1 Run 2b TDC Project													
		10,815	0	6	-10,815	-6	102,974	55,710	6	-47,264	55,704	1,105,744	
1.3.2 Run 2b Level 2 Project													
		7,633	0	5	-7,633	-5	7,633	20,535	3,363	12,902	17,172	366,655	
1.3.3 Run 2b XFII Project													
		17,028	0	0	-17,028	0	113,260	138	0	-113,122	138	1,146,971	
1.3.4 Event-Builder Upgrade													
		0	0	0	0	0	0	0	0	0	0	515,472	
1.3.5 Computer for Level 3 PC Farm/DAQ													
		0	0	0	0	0	17,808	0	0	-17,808	0	478,410	
1.3.6 SVT upgrade													
		0	0	0	0	0	0	0	0	0	0	174,441	
WBS[2]Totals:		35,476	0	11	-35,476	-11	241,675	76,383	3,369	-165,292	73,014	3,787,693	
1.4 Administration													
1.4.3 Construction Phase													
		37,134	26,185	29,186	-10,949	-3,001	256,562	245,291	180,103	-11,271	65,187	1,285,349	
WBS[2]Totals:		37,134	26,185	29,186	-10,949	-3,001	256,562	245,291	180,103	-11,271	65,187	1,285,349	
Funding Type-CATotals:													
		441,765	42,515	92,105	-399,250	-49,590	2,039,637	1,462,399	917,300	-577,239	545,099	17,422,423	
Gen. and Admin.													
		0	0	0	0	0	0	0	0	0	0	0	
Undist. Budget													
		441,765	42,515	92,105	-399,250	-49,590	2,039,637	1,462,399	917,300	-577,239	545,099	17,422,423	
Sub Total													
		441,765	42,515	92,105	-399,250	-49,590	2,039,637	1,462,399	917,300	-577,239	545,099	17,422,423	
Management Resrv.													
		441,765	42,515	92,105	-399,250	-49,590	2,039,637	1,462,399	917,300	-577,239	545,099	7,564,627	
Total													
		441,765	42,515	92,105	-399,250	-49,590	2,039,637	1,462,399	917,300	-577,239	545,099	24,987,050	

VII. VARIANCE ANALYSIS – P. Lukens

The earned value of the project was not calculated this month, due to the significant change in the meaning of the value, imposed by the cancellation of the silicon detector installation.

VIII. BASELINE CHANGES

No baseline changes were made in September. We are currently reevaluating the Project, with the plan to specify a new baseline in November, 2003.

IX. FUNDING PROFILES

The funding profile shown in the past is considered to be obsolete. A revised funding profile will be available after the new baseline is established.